Greening Project Status Report:

Denali National Park

Prepared for the
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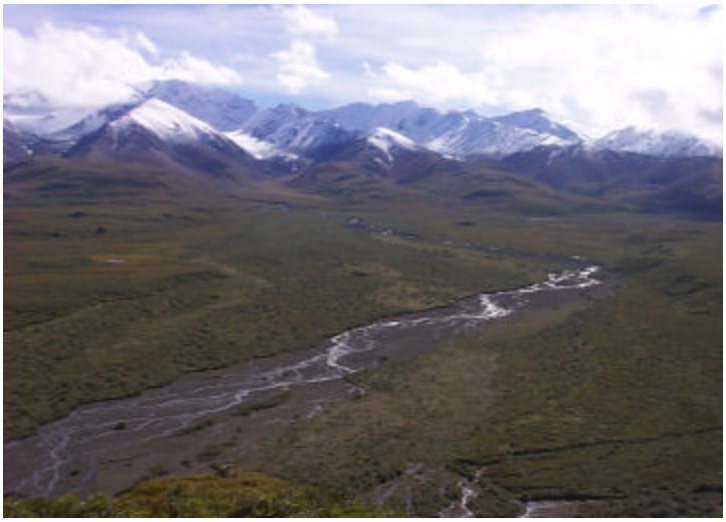
THE GREENING OF DENALI:
Status Report and Accomplishments

1. Background



Denali National Park

Denali National Park and Preserve is located in the heart of the Alaska Range, between Anchorage and Fairbanks. It contains the highest mountain in North America, Mt. McKinley, which has an elevation of 20,230 feet. The Athabascan native people called this peak *Denali*, which means "the high one."

The park was originally established as Mt. McKinley National Park in 1917. The park was designated a wilderness area and became Denali National Park and Preserve in 1980. The park and preserve together cover more than 6 million acres.

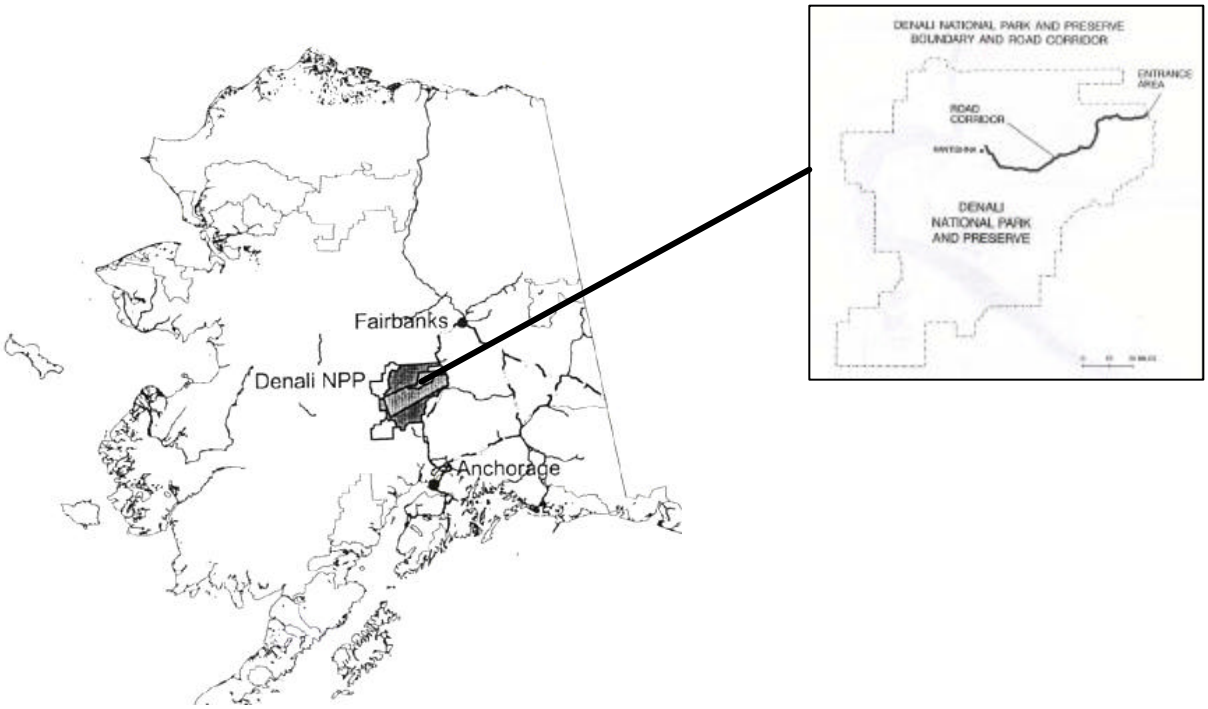
Denali teems with wildlife; 163 different species of birds and 37 species of mammals have been identified there. A trip into the park almost always results in ample sightings of animals such as caribou, grizzly bears, moose, Dall sheep, wolves, and foxes.

There are also 550 species of plants within two major zones of vegetation, *taiga* and *tundra*. At the lower elevations of the park, the spruce forest, with its stunted trees, is called *taiga.* Climbing out of the taiga forest, visitors enter the treeless tundra.

> *We cannot foretell the future, but we can give a nod towards it by putting this last treasure of wild country into an interest-bearing account. In the long view? all Alaska needs to do is be Alaska.*
> Margaret Murie, pioneer Alaskan conservationist and writer

Because of its northern latitude, this popular park can be cold even in the summer. Summer temperatures usually range from 20° to 70°F, and winter temperatures, from –50° to 10°F, with extremes as low as –65°F. Long summer days have more than 20 hours of daylight, while the shortest winter days have less than 5 hours of light. Summer days are often overcast, cool, and damp, however. Because of the great difficulty involved, mountain climbers have only about a 50% chance of summiting Mt. McKinley.

The primary means of seeing the park and preserve is along an 88-mile-long gravel road that is accessible to visitors only by bus. Nearly all development in the park is along this road, including visitor and administrative facilities, the utility infrastructure, and transportation-related development. A fleet of 100 buses supports about 300,000 riders each year. Many of the park's visitors choose to take the 66-mile round trip by bus to the Eielson Visitor Center; other bus trips are also available.



Denali National Park is located between Fairbanks and Anchorage. A "bus-only" 88-mile-long road allows visitors vehicular access to the park's interior.

2. Context of the Project

Park entrance

Preserving, protecting, and creating a sustainable future for Denali National Park and Preserve has long been an objective of the National Park Service (NPS) in the U.S. Department of the Interior. In recent years, these objectives have evolved into sustainable planning, design, and implementation activities.

In 1998, a workshop on development issues in the Denali area, "Designing for Community," and a Denali National Park Sustainable Design Charrette were conducted. A design charrette is a kind of brainstorming session in which as many project members as possible discuss all aspects of a design project before beginning the work. These events were part of a process designed to do the following:

- Bring information into the community from people with expertise in enhancing communities through design; these experts included building and landscape architects, energy specialists, community designers, and others.

- Provide a forum for area residents and business owners to discuss the information presented by the experts to determine which elements might apply to the Denali area.

Following the workshop and charrette, the steering committee for the events continued to meet in the Denali area. A citizens' group was then organized and named *Designing for Community*. Their goals were to expand involvement in sustainable activities and to begin implementing recommendations from the workshop. The citizen's group's ' activities have focused on Healy, a nearby community, and on Nenana Canyon, the park's commercial entrance area.

Nenana Canyon

In addition, the U.S. Department of Energy's (DOE's) National Renewable Energy Laboratory (NREL) funded a Sustainable Design Feasibility Study for the Park. This study focused on energy strategies for two remote sites: the Eielson Visitor Center and Wonder Lake Ranger Station. The report was completed in November 1999, and implementation of those strategies has begun.

Current sustainable design activities can be found in the Front Country Entrance Area Comprehensive Plan for Denali National Park. This effort addresses alternative transportation planning for the entrance area, especially auto, railroad, and bus traffic.

3. Design and Decision Process

Although park management is very interested in implementing sustainable designs and practices in new construction, the design and decision-making process for sustainable development in Denali has not been simple. In recent years, rapid growth in the number of visitors, staff shortages, and uncertainties in the construction budget have all made the implementation of green strategies and technologies extremely difficult. It has also been difficult to find the additional time and funding needed to adopt new design integration processes.

Nevertheless, charrettes, workshops, planning studies, training, and other activities continue to support sustainable development in the park. Partnerships with stakeholders have begun, and they are especially evident in transportation planning efforts. In April 2000, a sustainability scoping meeting was conducted that included NPS personnel, representatives of the DOE's Federal Energy Management Program (FEMP), and NREL staff to further address issues and strategies supporting sustainable development. Please see the table at the end of this report for the status of several greening activities.

According to Chief Architect Terry Emmons, NPS anticipates evolving to a national approach requiring all significant new building projects (beginning in fiscal year 2001) to be LEED-certified. LEED (Leadership in Energy and Environmental Design) is a green building rating system developed by the U.S. Green Building Council to evaluate the general environmental quality of a project design in terms of site, energy, water, indoor environmental quality, and materials. This requirement alone should lead to many sustainable design enhancements affecting future projects at Denali National Park.

4. Highlights of Environmental Strategies and Accomplishments

Transportation

Transportation to and within Denali National Park is a major environmental issue and thus a critical part of the sustainable development strategies. The NPS is developing and implementing a comprehensive plan that includes the following:

Buses are the main form of transportation in the park.

- Parking for up to 500 motor vehicles and circulation for thousands of vehicles on a daily basis in and around visitor services facilities
- Redevelopment of the historic railroad depot in cooperation with the Alaska Railroad Corporation and its commercial tourist operators
- Establishment of an integrated, visitor-friendly bus system that connects to commercial establishments outside the park's entrance, provides shuttle service in and around the entrance area, and maintains current operations involving travel into the park.

Buildings

The renovation and development of new facilities within the park and in the entrance area present many opportunities for sustainable development strategies. The strategies of ensuring climate-responsive building design, environmentally preferable materials, water conservation, and indoor environmental quality can all be improved, and there have been missed opportunities even in new structures. The LEED certification requirement will assist in this effort, but more staff time and money will be needed to obtain outside expertise, training of NPS personnel, design consultants, contractors, and cost-effective implementation.

Train depot at Denali

The NPS is seeking technical assistance to ensure that the best sustainable practices are incorporated into the Front Country Development Program and Toklat Housing project.

Energy

In the Denali entrance area, energy is provided by a nearby coal-fired power plant and by diesel fuel. In remote areas of the park, energy in buildings is provided primarily by using diesel fuel for electricity generation and space heating. Diesel fuel is also the primary source of fuel for park vehicles. The use of this fuel has resulted in a number of problems, including air emissions, noise pollution from generators, risks of ground contamination from spills, and increased maintenance and repair costs.

Visitor Center lighting could be turned off when there is ample dayight.

The patrol cabin at Savage River gets power from photovoltaics and wind systems.

Some energy conservation measures have been implemented in park facilities, but many opportunities still exist for retrofits and new construction, including improvements in building envelopes, lighting systems, and mechanical systems. Renewable energy systems, primarily photovoltaic (PV) systems, are used in a few areas in and around the park for railroad crossing signals, visitor shelters, and patrol cabins.

Two energy studies for Denali National Park have been conducted recently by ICRC—*Alternative Fuel Vehicles* (June 2000) and *Energy Conservation and Renewable Energy Feasibility Study for Eielson Visitors Center and Wonder Lake Ranger Station* (November 1999)—under contract to NREL. Both are being carefully studied for implementation.

The alternative fuels being considered for the transit fleet at Denali include liquefied petroleum gas (LPG, propane), liquefied natural gas (LNG), and compressed natural gas (CNG); hybrid electric vehicles are also being considered. The park's management intends to try out an alternative fuel vehicle in the near future to demonstrate its feasibility for incorporation into the transit bus fleet. The selection of a technology for the alternative fuel vehicle is expected soon.

For the Eielson and Wonder Lake facilities, these basic energy strategies are being considered:

- Reduce energy loads through lighting retrofits, upgrades to energy-efficient appliances, and building weatherization
- Switch fuels from diesel to propane for space heating, cooking, and power generation
- Install a PV system with battery storage, backed up by a propane generator.

Waste Management and Recycling

Park waste includes beverage containers, food packaging, camping supply packaging, and many other items left behind by visitors. Plastic and aluminum waste are collected in selected areas.

Bear-proof trash cans collect most park waste.

Bins are used to collect basic recyclables.

There is a small effort to minimize and recycle construction and demolition waste. LEED requirements might increase this effort over time.

Human bio-waste is treated in conventional ways with septic tanks, leach fields, and portable toilets. Composting toilets were tried but didn't work well because of the cool climate and short summer season.

Pollution Prevention

Reducing the use of diesel fuel will also reduce a primary source of air and ground pollution in the park. For example, tanker trucks on the George Parks Highway now cause atmospheric pollution. Diesel fuel spills cause ground pollution.

Energy efficiency, renewable energy, and alternative fuel vehicles can all help to reduce the emissions and spills from diesel fuel use as well as coal-fired power plant emissions.

Eielson Visitor Center storage tank holds diesel fuel used for power generation and space heating.

5. Acknowledgments

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Status of Greening Strategies

Transportation	
Actions	Comments
Add parking for up to 500 motor vehicles and circulation for thousands of vehicles on a daily basis in and around the visitor services facilities	Planning in process
Redevelop historic railroad depot in cooperation with the Alaska Railroad Corporation and all its commercial tourist operators	Planning in process
Establish an integrated, visitor-friendly bus system that connects to commercial establishments outside the park entrance, provides shuttle service in and around the entrance area, and maintains the current operations involving travel into the park	Planning in process
Conduct training on alternative transportation	NPS alternative transportation training session conducted in January 2000
Buildings and Facility Development	
Actions	Comments
Establish Front Country Entrance Area Comprehensive Plan	Completed
Consider sustainable design strategies for ongoing building projects	This is done to the extent possible with current projects and staff; NREL could provide critical help here with training workshops and design charrettes
Require all new and major renovations of buildings to achieve certification using the LEED Green Building Rating System	This has been implemented
Employ sustainable practice in the Front Country Development Program	Technical assistance is being solicited
Employ sustainable practices in the development of the Toklat Housing Area	Technical assistance is being solicited
Continue planning with Design with Community Citizens Group	This group continues to meet
Energy	
Actions	Comments
Implement energy conservation measures and renewable energy systems in existing buildings	Some improvements have been incorporated into current building stock, including energy-efficient lighting and photovoltaic systems
Reduce/eliminate diesel fuel from Wonder Lake Ranger Station and Eielson Visitor Center	Phase one of project is complete and phase two has begun
Develop alternative fuel vehicles to replace the current diesel-powered fleet	Feasibility study was completed; the NPS is seeking technical assistance for the next phase of implementation
Incorporate energy efficiency and renewable energy into new building projects	• Technical assistance regarding energy is being solicited for the Toklat Housing project and the Front Country Development Program • The LEED Green Building Rating System will result in energy efficiency being more carefully considered in new projects • NREL could provide critical assistance here with training workshops and design charrettes

Waste Management and Recycling	
Actions	Comments
Reduce, reuse, and recycle visitor waste	Some effort is made regarding recycling, with a few recycling containers for separation. However, many recyclable items still end up in the waste stream, going first to a nearby waste holding facility, then to a more distant landfill
Minimize and recycle construction and demolition waste	Some effort here, but LEED will reinforce its importance
Use salvaged and recycled materials for building and landscape projects	Some effort, but LEED will reinforce its importance
Use biological waste treatment systems for graywater and blackwater	Typical septic tanks and leach fields are used. Composting toilets were tried but didn't work very well
Pollution Prevention	
Actions	Comments
Reduce fossil fuel (mainly diesel) burning for use in buildings	A plan to reduce energy loads, switch fuels to propane, and use photovoltaics has been initiated for Eielson Visitor Center and Wonder Lake Ranger Station. Other techniques for new construction will be considered during the design process
Reduce fossil fuel (mainly diesel) use in vehicles	A fuel switching program through alternative fuel vehicles is under way, including the selection of a demonstration vehicle

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